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Collection of Native Grass Seed in the Great Plains, U.S.A.

ABERYSTWYTH, SEPTEMBER, 1937.

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BULLETIN 24

COLLECTION OF NATIVE GRASS SEED IN THE GREAT PLAINS, U.S.A.

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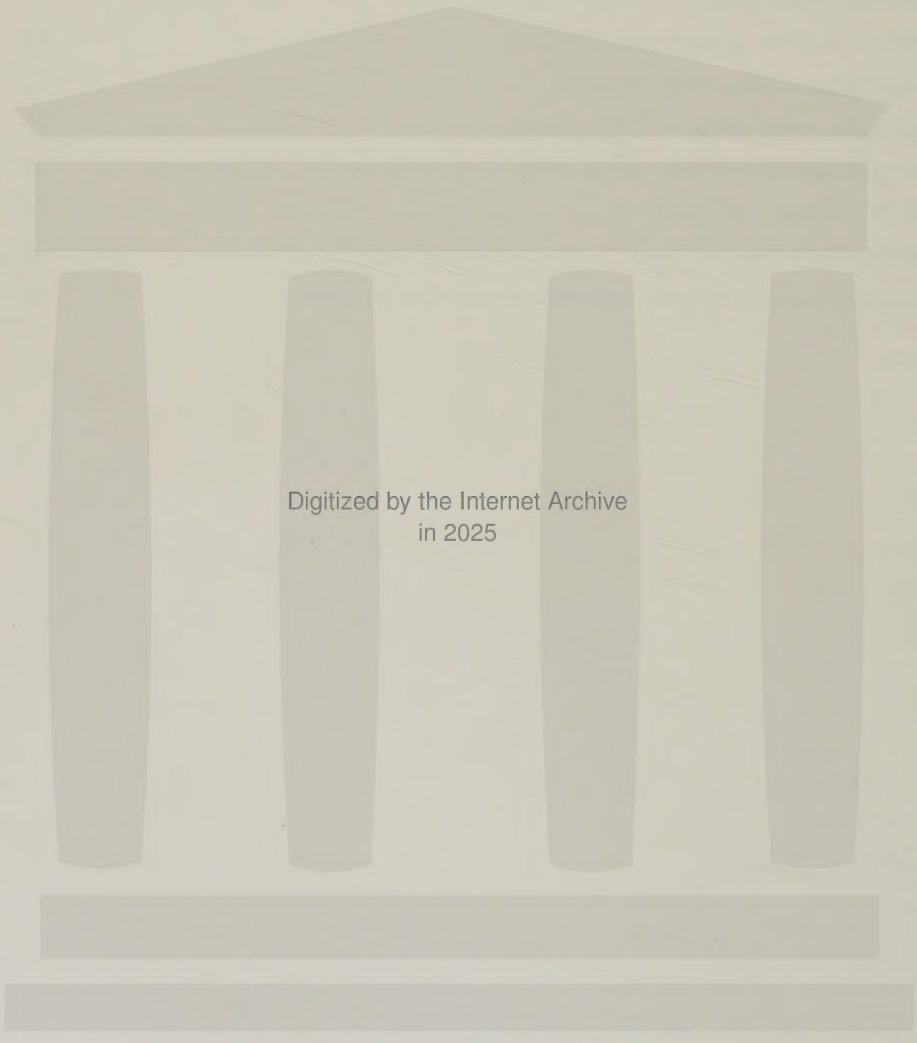

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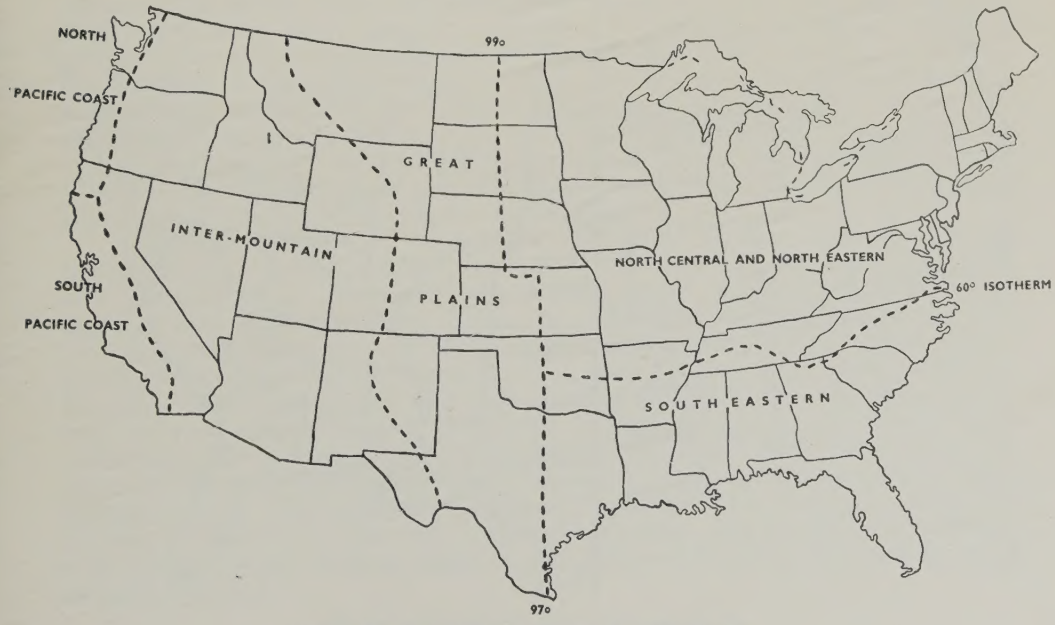
COLLECTION OF NATIVE GRASS SEED IN THE GREAT PLAINS, U.S.A.

NATIVE grasses are recognized as the basis of the general revegetation programme of the Soil Conservation Service, particularly throughout the Great Plains States. Responsibility for quantity collection of native species has been placed with the Nursery Section of the Soil Conservation Service and noteworthy progress has been made in the collection of the more important species such as western wheat grass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), bluestem (*Andropogon* sp.), dropseed (*Sporobolus* sp.) and buffalo grass (*Buchloë dactyloides*). Since this programme represents the first known attempt to collect these grasses in quantity many unusual and difficult problems were encountered, especially as these relate to the peculiarities of the different species.

While all problems associated with the quantity collection of native grass seed have not been satisfactorily solved, it is believed that enough experience has been gained and sufficient progress made to furnish a practical basis for the collection of the major species, with the exception of buffalo grass. No satisfactory method has been developed for harvesting the seed of this grass due to its peculiar seed-forming and prostrate growth habits. This matter is being given careful study, however, both from the standpoint of mechanical harvesting devices and selection for morphological forms within the species that will be better adapted to the uses in mind. It is hoped that a means of artificial seeding may be found that will permit the general use of this excellent soil-stabilizing plant throughout the range of its adaptation.



Major Pasture Regions of the United States.

Most native species shatter their seed soon after ripening, which makes their period of harvest much briefer than that of cultivated grasses. Instances are not uncommon in which, after complete preparations had been made to harvest seed in certain localities, the entire crop was destroyed by storms or blasted by hot dry winds. This condition was overcome in part by the use of special machinery capable of harvesting considerable quantities of seed in a short time, most noteworthy of these devices being the power stripper which can harvest 25 to 30 acres per day for each unit. Selection of non-shattering strains within the major native species offers an excellent opportunity for the plant breeder and progressive development in this field is anxiously awaited by all agencies interested in the use of native grasses.

Western wheatgrass (*Agropyron smithii*), which is found growing in almost pure stands on heavy soils from Montana to Arizona, was harvested with greatest ease. This grass is similar to cultivated wheat in habit of growth and is one of the few native grasses that can be harvested with a combine.

Because of these facts it lends itself well to harvesting by farmers, and during the 1936 season the Soil Conservation Service secured the co-operation of the grain farmers of the West in the harvesting of some 400,000 pounds of seed. The Service was greatly favoured by securing, in the only way possible at the time, a fine lot of seed, while the farmers were benefited by receiving cash returns for the seed and, in addition, were enabled to harvest a hay crop.

Realizing that the collection of native seed afforded a means of ready income, the farmers harvested considerably more western wheatgrass seed in the 1936 season than was contracted for by the Service. As a result, this extra seed is now available, which is fortunate in view of the almost total crop failure of western wheatgrass this season because of drought conditions.

Some of the other major native grasses which are not adapted to harvesting with a combine, may be harvested with ordinary farm machinery such as mowers,

Regions of the Soil Conservation Service.

but when so harvested extreme care must be used in subsequent handling to prevent loss from shattering.

The power strippers mentioned previously, because of their self-mobility and ease of height adjustment, were found to be the most practical type of equipment for this work. These stripper units consist of a rotating spike tooth cylinder driven by chain and sprocket from the rear wheel of a car chassis. Appropriate changes are made in the steering apparatus to permit driving the car in reverse, the hopper and cylinder units being placed on what would normally be the back of the car chassis. Since these units were made from used car parts the cost of construction was held at a minimum and, due to the rugged type of equipment, it could be used on rough terrain where ordinary farm equipment could not be operated.

In many instances it was found desirable to use ordinary bluegrass strippers as harvesting units. If horses were used the farm owner was given an opportunity to participate in the labour programme. A very efficient unit consisted of three bluegrass strippers hitched in tandem and pulled by a farm tractor. Such a unit could be operated by two men and would harvest 25 acres a day. It is believed that the harvesting of native grass seed by farmers will be greatly stimulated by the accomplishments of the programme to date, and the seed of many native species not hitherto available on the market will be harvested for this purpose when it is realized that seeds of these native grasses have a cash sale value.

In addition to the quantity collection of native seed, the nurseries are growing some of the more desirable grasses for seed production. The need for this type of work becomes evident when it is realized that some of our most valuable range-forage and erosion-control species have become almost completely eradicated by overgrazing and other improper land-use practices, so that it is difficult to collect their seed in sufficient quantities for reseeding purposes, the only recourse being to produce the seed under cultivation.

Nursery tests indicate that high yields of viable seed may be expected from certain native grasses under cultivation, some species giving two seed crops annually when grown under very favourable conditions. It is believed that the production of seed of native grasses for market purposes will become a new farm enterprise when the handling of these crops for seed production is more fully understood. This assumption is supported by the fact that farmers have already begun to grow certain of the native grasses for seed in a few of our Great Plains States. The parent seed stocks for plantings of this character should be made from carefully selected material, which emphasizes the need for assistance from plant breeders who are doing selection and breeding work with the native plants.

The Nursery Section, in co-operation with other interested agencies, is giving special attention to the assembly, cultivation and observation of promising species and strains of both native and introduced plants. Our seed and plant collectors are urged to keep constantly on the lookout for plants which may be an improvement over those now being used. This may include kinds which because of special properties, such as soil binding, ground cover, drought resistance, self-reproduction, simplicity of propagation, or ease of harvesting, are especially valuable for use in wind or water-erosion control. A number of nurseries where such work is being undertaken have been established in the Great Plains area. Plant collections of this nature in this area consist of more than a thousand species and strains, some of which indicate promise of usefulness for the purposes in mind. This material is used by the Division of Research of the Soil Conservation Service, and the Division of Forage Crops of the Bureau of Plant Industry, as a source of breeding stock and for other research purposes.

The collection of native grass seed, as well as the further development of small areas where the natural conditions are especially favourable to seed production, are facilitated by the fact that during the course of regular seed and plant collecting operations the locations where seed producing areas occur are carefully charted. Owing to the wide distribution of these species, the areas where seed can be collected in quantity will vary considerably from year to year according to weather conditions.

Photographs with descriptive information are appended to supplement statements given in this paper.

FIG. 1.—Western wheatgrass (*Agropyron smithii*). This species is adapted to a wide range of climatic and soil conditions and is found in almost pure stands on the heavy soil types from Montana to Arizona. This is one of the few native species that can be harvested with small grain combine equipment, over 400,000 lb. being harvested in this manner during the 1936 season. Yields of 100-250 lb. of machine-run seed per acre germinating 60 per cent were not uncommon. This grass is highly valued both for grazing and cured forage and ranks well among the major native species in the erosion control programme.

FIG. 2.—Little bluestem (*Andropogon scoparius*). This species is adapted to the soil and climatic conditions characteristic of the eastern portion of the Great Plains and is the dominant species of the mixed prairie vegetation native to the area. Seed was most satisfactorily harvested with the power stripper equipment described in the text, over 50,000 lb. of seed being obtained in this manner. This grass is highly prized for grazing and is the principal constituent of the native prairie hay on the midwestern markets. This species finds important use in the Soil Conservation Service in the revegetation of abandoned farm lands throughout the eastern portion of the Great Plains Area.

FIG. 3.—Big bluestem (*Andropogon furcatus*). This species is a companion to little bluestem previously described, but in general requires a more favourable growing site, particularly as to available moisture, than *A. scoparius*. The power stripper was used successfully in harvesting this seed, over 30,000 lb. being obtained during the past season. Native meadows were leased from the owners for the privilege of harvesting seed ; the hay crop was then harvested by the owner for his own use. Good seed was obtained from aftermath of meadows that were cut for hay in July. Yields of over 100 lb. per acre were reported from certain of the better uncut meadows.

FIG. 4.—Buffalo grass (*Buchloë dactyloides*). This species is adapted to the climatic and soil conditions found throughout the western portion of the Great Plains. The species is stoloniferous and prostrate in growth habit. Seed is borne in burs attached to short culms, which makes the task of harvesting with machinery very difficult. Plants are dioecious.

FIG. 5.—Alkali sacaton (*Sporobolus airoides*). Several of the " Dropseed " species play an important role in the revegetation programme of the Service throughout the Great Plains States. The seed of this species is relatively easy to obtain with strippers ; the period of harvest for a given area, however, is limited due to the tendency to shatter upon ripening. This species finds general use in seed mixtures with other major native grasses commonly used in reseeding abandoned agricultural areas.

FIG. 6.—Blue grama (*Bouteloua gracilis*). This species has a wide range of climatic and soil adaptation and is the dominant native species throughout the western portion of the Great Plains. This grass is extremely drought resistant and is used extensively in the revegetation programme of the Service in the " Dust Bowl " area. Seed is readily harvested with bluegrass strippers, over 80,000 lb. being obtained in this manner during the past season.

FIG. 7.—Blue grama (*Bouteloua gracilis*). Increase seed block of blue grama at one of the Service Nurseries. Two seed crops of this grass may be obtained in one season where grown under favourable moisture and climatic conditions. Native stands of this species show remarkable ability to make quick recovery following periods of prolonged drought. This native grass is one of the most promising for general use throughout the western portion of the Great Plains.

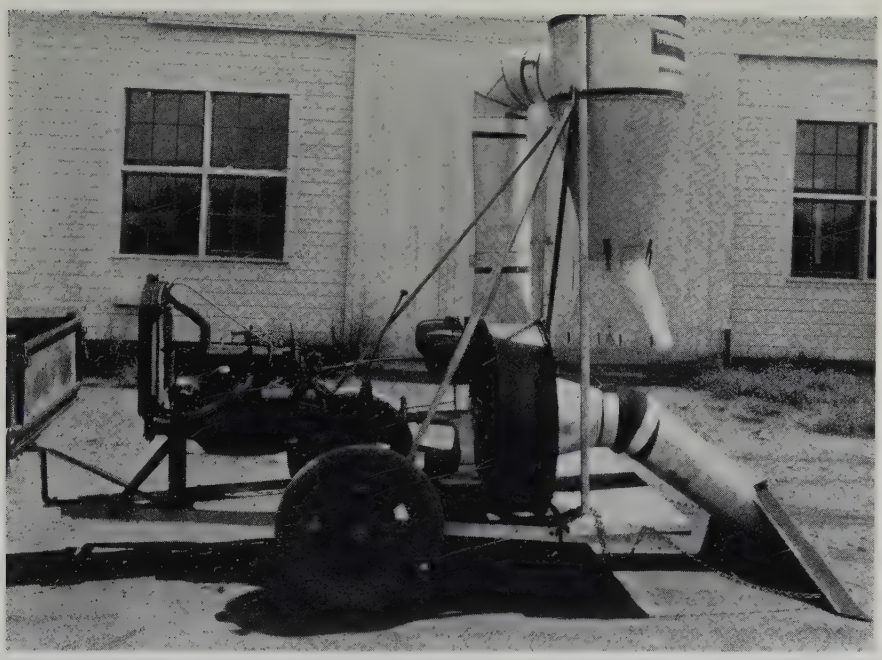


FIG. 8.—Experimental machine constructed to harvest seed of buffalo grass. Suction developed by the rapidly revolving fan is used to pick up the seed burs from the sod. Many problems need further study before this machine can be considered as an economical unit.

FIGS. 9 AND 10.—Power strippers constructed as described in the text have proved most useful in the quantity collection programme. These rugged machines are mobile, easily adjusted and can be successfully operated over rough terrain. Each unit can cover an area of 25 acres in one day.

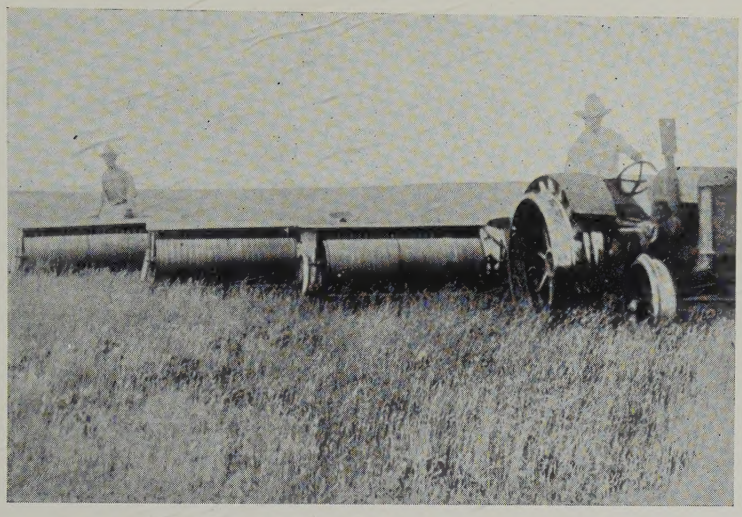


FIG. 11.—Bluegrass strippers have been used successfully to harvest most of the native species. A very efficient unit consists of three strippers hooked in tandem and pulled by a tractor. This type of unit can be operated by two men and will cover 25 acres per day. Height adjustment cannot be made as readily with this type of equipment as with the power stripper described previously.

FIG. 12.—Regular farm equipment including small grain combines can be successfully used with certain of the native species. Western wheatgrass was harvested in this manner and a large surplus of this species was obtained during the past year. Germination of 60 per cent was obtained from seed harvested in this manner without additional cleaning.

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